CLAIMS

Sub B1

1) Method for use in controlling the emission power of a transceiver (20) which is in communication with another transceiver (10) via a communication system, said method including the steps of measuring the amplitude or the power of the signal received by said transceiver (20) and of evaluating a power control command (*PC*) which is then used to command the emission power (*P*) of said transceiver according to said control command signal (*PC*), wherein it includes the steps of evaluating the fast fading duration of the received signal on basis of said amplitude or power measurement and of deducing the power control command (*PC*) from said fast fading duration.

2) Method for use in controlling the emission power according to claim 1, wherein it includes the steps of comparing the evaluated fast fading duration with the time duration between the amplitude or the power measurement and the emission power setting, and in determining said power control command (*PC*) according to the result of said comparison.

3) Method for use in controlling the emission power according to claim 2, wherein it includes the step in setting the power control command (*PC*) at the inverse of the measured amplitude ($1/L_m$) if the fading duration is higher than the time duration between the amplitude or power measurement and the emission power setting and at the inverse of the average of the measured amplitude if it is equal to or lower than said time duration :

$$PC(t_d) = \begin{cases} 1/L_m & \text{if } t_f \succ t_d \\ 1/L_{av} & \text{if } t_f \leq t_d \end{cases}$$

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4) Method for use in controlling the emission power according to ~~one of the preceding~~ claim 1 ~~to 3~~, wherein said fading duration is evaluated by means of the following equation:

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$$t_f = \begin{cases} (a) & \dfrac{\lambda}{\sqrt{2\pi}\,\bar{L}\nu}\left[e^{(\bar{L}^2)} - 1\right] & \text{if } \bar{L} \prec 1 \\ (b) & \dfrac{\lambda}{\sqrt{2\pi}\,\bar{L}\nu} & \text{if } \bar{L} \geq 1 \end{cases}$$

where $\overline{L}$ is the received amplitude L_m at a measurement time normalised by the short-term average amplitude L_{av} ($\overline{L} = L_m/L_{av}$), v and λ are respectively the speed of the said transceiver (20) relative to the other transceiver (10) and the wavelength of the carrier used by the communication system.

5) Method for use in controlling the emission power according to ~~one of the preceding~~ claim~~s~~ 1 ~~to 4,~~ wherein said power control command signal (PC) is given by the following scheme :

$$PC(t_d) = \begin{cases} 1/L_m \begin{cases} if\ \overline{L} \prec 1\ and\ t_d \prec \dfrac{\lambda}{\sqrt{2\pi}\,\overline{L}v}[e^{(\overline{L}^2)} - 1] \\ if\ \overline{L} \geq 1\ and\ t_d \prec \dfrac{\lambda}{\sqrt{2\pi}\,\overline{L}v} \end{cases} \\ 1/L_{av} \begin{cases} if\ \overline{L} \prec 1\ and\ t_d \geq \dfrac{\lambda}{\sqrt{2\pi}\,\overline{L}v}[e^{(\overline{L}^2)} - 1] \\ if\ \overline{L} \geq 1\ and\ t_d \geq \dfrac{\lambda}{\sqrt{2\pi}\,\overline{L}v} \end{cases} \end{cases}$$

where $PC(t_d)$ is the power control command signal which will be used at the present time (assumed to zero) + t_d, L_m is the measured amplitude, L_{av} is the short-term average of the measured amplitude, t_d is the time delay between the moment of the measurement of the measured amplitude L_m and the use of the PC command and $\overline{L} = \dfrac{L_m}{L_{av}}$ is the normalised measured amplitude.

6) Method for use in controlling the emission power according to ~~one of the preceding~~ claim~~s~~ 1 ~~to 4,~~ wherein said power control command signal (PC) is given by the following scheme :

$$PC(t_d) = \begin{cases} 1/L_m & if\ t_d \prec \dfrac{\lambda * \min(\overline{L}, \frac{1}{\overline{L}})}{\sqrt{2\pi}v} \\ 1/L_{av} & if\ t_d \geq \dfrac{\lambda * \min(\overline{L}, \frac{1}{\overline{L}})}{\sqrt{2\pi}v} \end{cases}$$

where $PC(t_d)$ is the power control command which will be used at the present time (assumed to zero) ÷ t_d, L_m is the measured amplitude, L_{av} is the short-term average of the measured amplitude, t_d is the time delay between the moment of the measurement of the measured amplitude L_m and the use of the PC command and $\overline{L}=\frac{L_m}{L_{av}}$ is the normalised measured amplitude.

7) Apparatus in a transceiver (10, 20) in a communication system arranged for use in carrying out the method of one of the preceding claims, said apparatus including an evaluating unit (200) for evaluating a power command (PC) on basis of the signal received by the transceiver (10, 20) and a transmission unit (210) provided to transmit signals with a power (P) corresponding to the power command (PC), wherein the evaluating unit (200) includes an estimation unit (23) for estimating the fast fading duration of the signal received by the transceiver and a control unit (24) for determining the power command (PC) on basis of the fast fading duration estimation made by the unit (23).

8) Apparatus according to claim 7, wherein the control unit (24) is provided to compare the evaluated fast fading duration with the time duration between the amplitude or the power measurement and the emission power setting, and in determining said power control command (PC) according to the result of said comparison.

9) Apparatus according to claim 8, wherein it has a measurement unit (12) for measuring the amplitude or the power of the received signal and averaging unit (22) for determining the short-term average of the measured amplitude or power, the control unit (24) being provided to set the power control command (PC) at the inverse of the measured amplitude ($1/L_m$) if the fading duration is higher than the time duration between the amplitude or power measurement and the emission power setting and at the inverse of the average of the measured amplitude if it is equal to or lower than said time duration :

$$PC(t_d)=\begin{cases}1/L_m & if\ t_f \succ t_d\\ 1/L_{av} & if\ tf \leq\ t_d\end{cases}$$

10) Apparatus according to ~~one of the preceding~~ claims 7 ~~to 9~~, wherein the estimation unit (23) is provided to evaluate the fading duration by means of the following equation:

$$t_f = \begin{cases} (a) & \dfrac{\lambda}{\sqrt{2\pi}\,\overline{L}v}[e^{(\overline{L}^2)} - 1] & \text{if } \overline{L} \prec 1 \\ (b) & \dfrac{\lambda}{\sqrt{2\pi}\,\overline{L}v} & \text{if } \overline{L} \geq 1 \end{cases}$$

where $\overline{L}$ is the received amplitude L_m at a measurement time normalised by the short-term average amplitude L_{av} ($\overline{L} = L_m/L_{av}$), v and λ are respectively the speed of the said transceiver (20) relative to the other transceiver (10) and the wavelength of the carrier used by the communication system.

11) Apparatus according to one of the preceding claims, wherein said power control command signal (PC) delivered by the control unit (24) is given by the following scheme :

$$PC(t_d) = \begin{cases} 1/L_m \begin{cases} \text{if } \overline{L} \prec 1 \text{ and } t_d \prec \dfrac{\lambda}{\sqrt{2\pi}\,\overline{L}v}[e^{(\overline{L}^2)} - 1] \\ \text{if } \overline{L} \geq 1 \text{ and } t_d \prec \dfrac{\lambda}{\sqrt{2\pi}\,\overline{L}v} \end{cases} \\ 1/L_{av} \begin{cases} \text{if } \overline{L} \prec 1 \text{ and } t_d \geq \dfrac{\lambda}{\sqrt{2\pi}\,\overline{L}v}[e^{(\overline{L}^2)} - 1] \\ \text{if } \overline{L} \geq 1 \text{ and } t_d \geq \dfrac{\lambda}{\sqrt{2\pi}\,\overline{L}v} \end{cases} \end{cases}$$

where $PC(t_d)$ is the power control command signal which will be used at the present time (assumed to zero) + t_d, L_m is the measured amplitude, L_{av} is the short-term average of the measured amplitude, t_d is the time delay between the moment of the measurement of the measured amplitude L_m and the use of the PC command and $\overline{L} = \dfrac{L_m}{L_{av}}$ is the normalised measured amplitude.

12) Apparatus according to ~~one of the preceding~~ claims 7 ~~to 11~~, wherein said power control command signal (PC) delivered by the control unit (24) is given by the following scheme :

$$PC(t_d) = \begin{cases} 1/L_m & if\ t_d \prec \dfrac{\lambda * \min(\overline{L}, \frac{1}{\overline{L}})}{\sqrt{2\pi\nu}} \\ 1/L_{av} & if\ t_d \geq \dfrac{\lambda * \min(\overline{L}, \frac{1}{\overline{L}})}{\sqrt{2\pi\nu}} \end{cases}$$

where $PC(t_d)$ is the power control command which will be used at the present time (assumed to zero) + t_d, L_m is the measured amplitude, L_{av} is the short-term average of the measured amplitude, t_d is the time delay between the moment of the measurement of the measured amplitude L_m and the use of the PC command and $\overline{L} = \dfrac{L_m}{L_{av}}$ is the normalised measured amplitude.